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IS 14337 (1996): Shipbuilding - Mineral fibre resin bonded slabs [TED 17: Shipbuilding]

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Indian Standard

SHIPBUILDING — MINERAL FIBRE RESIN BONDED SLABS — SPECIFICATION

ICS 47.020.05

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

March 1996

Price Group 3

Shipbuilding Sectional Committee, TED 17

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Shipbuilding Sectional Committee had been approved by the Transport Engineering Division Council.

Mineral fibre resin bonded slabs are used for thermal insulation as well as accoustic lagging on board ships. Its properties can be varied widely in the process of manufacture to meet both general and specific requirements.

In the preparation of the standard, assistance has also been drawn from Naval Specification No. NCD 1412 'Specification for mineral fibre resin bonded slabs' and BS 2972 : 1989 'Methods of tests for inorganic thermal insulating materials for formulating water absorption test'.

The Committee responsible for the preparation of this standard is given in Annex D.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

SHIPBUILDING — MINERAL FIBRE RESIN BONDED SLABS — SPECIFICATION

1 SCOPE

This standard covers the requirements, and methods of sampling and tests for mineral fibre resin bonded slabs for thermal insulation and accoustic lagging intended for use on flat surfaces operating at temperatures from −25°C to 350°C.

2 REFERENCES

The following Indian Standards are necessary adjuncts to this standard:

IS No.	*Title*
460 (Part 2) : 1985	Specification for test sieves : Part 2 Perforated plate test sieves (*third revision*)
3069 : 1994	Glossary of terms, symbols and units relating to thermal insulation materials (*first revision*)
3144 : 1990	Mineral wools thermal insulation materials — Method of test (*second revision*)
3346 : 1980	Method for the determination of thermal conductivity of thermal insulation materials (two slab guarded hot-plate method) (*first revision*)
13286 : 1992	Surface spread of flame for thermal insulation materials — Methods of test

3 TERMINOLOGY

For the purpose of this standard, the definitions of the terms, symbols and units given in IS 3069 : 1994 shall apply.

4 MATERIALS

4.1 The materials shall consist of glass, rock or slag fibres impregnated with a suitable resin binder.

5 MANUFACTURE

5.1 The mineral fibre shall be compressed or otherwise formed into slabs of the required dimensions.

6 REQUIREMENTS

6.1 The materials shall conform to the requirements given in Table 1 when tested in accordance with the methods prescribed in col 4 of Table 1.

6.2 Sizes and Dimensions

Slabs may be supplied in dimensions of 1 000 mm × 500 mm and thicknesses of 25, 50 and 75 or 100 mm. Other sizes as agreed to between the purchaser and the supplier may also be supplied.

6.3 Weight

The maximum weight of the finished slabs shall not exceed the values given below:

Thickness, mm	*Mass*, kg/m^2
25	1

Table 1 Requirements for Mineral Fibre Resin Bonded Slabs

(*Clause* 6.1)

Sl No.	Characteristic	Requirement		Method of Test, Ref to	
		Min	*Max*	Clause	IS No.
(1)	(2)	(3)	(4)	(5)	(6)
i)	Alkalinity, percent	—	1	25	3144
ii)	Shot content, percent by mass[1)] IS Sieve [*see* IS 460 (Part 2) : 1992]			13	3144
	500 micorn	—	5		
	250 micron	—	15		
iii)	Water absorption kg/m^2	—	4	Annex A	
iv)	Surface spread of flame	To comply with class 1 material			13286
v)	Thermal conductivity 20°C w/m°C	—	0.035		3346
vi)	Resin content, percent	5	10	Annex B	
vii)	Length and width			6	3144
viii)	Thickness	—	—	7	3144

1) Any shot present in the bonded material shall not be geater than 5 mm in any dimension.

Thickness, mm	*Mass*, kg/m^2
50	2
75	3
100	4

6.4 Tolerances

The dimensions of the product supplied shall not deviate from those specified by more than the tolerances given in Table 2.

Table 2 Dimensional Tolerances for Mineral Fibre Resin Bonded Slabs
(*Clause* 6.4)

All dimensions in millimetres.

Sl No.	Dimension	Slabs
(1)	(2)	(3)
i)	Length	± 6
ii)	Width	± 6
iii)	Thickness	± 3
iv)	Mass, percent	+ 0 − 15

7 WORKMANSHIP AND FINISH

7.1 General

The surface of the finished slabs shall be smooth and free from any irregularities and visible defects.

8 TESTS

8.1 Type Tests

The type tests shall be carried out on the material to check the conformity with the requirements of the specification as given in Table 1. Fresh type tests shall be carrried out whenever there is any change in the formulation of the material.

8.2 Production Test

All the tests specified in Table 1 (except thermal conductivity and water absorption) shall constitute production tests.

9 PACKING AND MARKING

9.1 Packing

The slabs shall be packed in cartons containing not more than 25 slabs. Each slab shall be provided with interleaving sheets of fire resistant paper marked 'Wrapped fire proof'.

9.2 Marking

The packages shall be legibly and indelibly marked with the following information:

a) Name of the manufacturer and recognized trade-mark, if any;
b) Length, width and thickness of the material;
c) Quantity; and
d) Batch or lot number.

9.2.1 *BIS Certification Marking*

The slabs may also be marked with the Standard Mark.

9.2.1.1 The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act*, 1986 and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

10 SAMPLING

The method of drawing representative samples of the material and criteria for conformity shall be as prescribed in Annex C.

ANNEX A

(*Table* 1)

WATER ABSORPTION TEST

A-1 GENERAL

This method specifies testing of mineral fibre marine board for thermal insulation under conditions of partial immersion in water.

A-2 SPECIMENS

A-2.1 Number and Size

Six to nine specimens shall be taken for this test. The size of the specimen shall be 150 mm^2 and preferably not less than 25 mm thick.

A-2.2 Preparation of Test Specimens

A-2.2.1 Weigh the specimens as received and subsequently dry to constant mass. Determine the dry mass of the specimen. For materials having a recommended upper temperature limit of less than 120°C, dry the specimen in a desiccator. Where the upper temperature limit is 120°C or over, dry the specimen in a ventilated oven at 105°C to 110°C.

A-2.2.2 Loose, fibrous, granular and powdered materials shall be carefully and evenly packed to a specified bulk density into an open topped, perforated sheet-metal or gauze container, measuring 150 mm × 150 mm preferably 25 mm internally, fitted with a lid of the same material.

A-3 PROCEDURE

A-3.1 Partial Immersion

Suspend the specimen, prepared as in **A-2.2**, vertically with one 150 mm × 25 mm side immersed 6 mm below the surface of tap water for 48 h. Maintain the water at constant level by means of a slow constant feed and fixed overflow pipe.

At the end of the period of immersion, suspend the specimen by one corner and allow to drain for 5 minutes. When applicable, wipe off the excess surface water with a dry cloth or remove by the careful application of blotting paper. Weigh the specimen immediately.

A-4 EXPRESSION OF RESULTS

The results of the tests shall be expressed as follows:

a) The increase in mass expressed in kg of water/m^2 of immersed horizontal surface,

b) The bulk density of the specimen before testing, and

c) The condition of the specimen, particularly any signs of deterioration.

ANNEX B

(*Table* 1)

METHOD OF DETERMINATION OF RESIN CONTENT

B-1 APPARATUS

B-1.1 Weighing balance capable of weighing up to 0.01 mg.

B-1.2 Thermostatically controlled oven, range 0-1 000°C ± 2°C.

B-1.3 Timing device shall be capable of recording elapsed time to the nearest second, and shall be accurate to within 1 second in 1 hour.

B-2 PROCEDURE

When determined by the weight loss on ignition at 650°C for 1 hour, the resin content shall satisfy the requirements given in Table 1.

ANNEX C

(*Clause* 10)

SAMPLING OF MINERAL FIBRE RESIN BONDED SLABS

C-1 SCALE OF SAMPLING

C-1.1 Lot

All the material of the same density produced under essentially the same conditions of manufacture shall be grouped and each such group shall constitute a separate lot.

NOTE — The purchaser and the supplier may mutually agree to term the material manufactured during a certain period as a lot. It is recommended that an 8-hour production under essentially same conditions may be termed as a lot.

C-2 SAMPLE SIZE AND NUMBER OF TESTS

C-2.1 One board shall be selected at random for each of the requirements (i) to (vi) given in Table 1 from a lot of any size. For length, width and thickness the number of slabs selected shall be as under:

Lot Size	*No. of Slabs Selected*
Up to 200	5
201 to 300	6
301 to 500	7
501 to 800	8
801 to 1 300	9
1 301 and above	10

C-2.2 Criteria for Conformity

The lot shall be declared as conforming to the requirements of this specification if the different test results obtained under **C-2.1** meet the corresponding requirements given in the standard individually.

ANNEX D

(Foreword)

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